

Content Analysis of Web Pages for Distance Learning Engineering Programs

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Introduction

With the introduction of Web based information, the topic of evaluating Web sites has become increasingly important. In the last three years several evaluation criteria have been developed and the evaluation of Web sites is becoming a major research topic. Content analysis is a well known research technique used in a number of fields, for instance in linguistics, social sciences and psychology. In marketing, at least in the last twenty five years, content analysis has been used to evaluate the quality and value of product advertising in different medium: newspapers, television, magazines, etc. More recently content analysis is also being used to evaluate information provided at Web sites.

In this study Web site distance learning engineering programs are analyzed to determine how well they have been constructed. A set of evaluative criteria were selected for this purpose.

Evaluation Criteria used in the literature.

A review of the literature of content analysis for the evaluation of Web sites indicates the existence of a number of important and common elements determining the quality of a Web site. The factors included in recent studies or mentioned in the literature as important are:

1. Approachability, currency, authority, accuracy. Karen Diller (1996).
2. Authority, accuracy, objectivity, currency, coverage. Jan Alexander and Marsha Tane (1996).
3. Intended audience, objective reasoning, coverage, writing style, evaluative reviews. Ormondroyd, J., Engle, M., and Cosgrave, T. (1996).
4. Price or value, quality, performance, components or contents, availability, special offer, taste, package or shape, guarantee or warranties, safety, nutrition, independent research, company-sponsored research, new ideas. (factors created by Resnik and Stern, 1977) and used by Salam, Rao and Pegels (1998).
5. Accuracy, authority, objectivity, currency, coverage, accessibility, structure. Danielle Borasky (1997).
6. Accuracy, currency, references, readability, authorship, purpose, page aesthetics (style, graphics, layering). Pealer, Lisa and Steve Dorman (1997).
7. Purpose, authority, content, technical quality. Druse, Judy (1998).
8. Content. Grassian, Esther (1995).

Evaluation criteria used in this study.

For the purpose of evaluating the Web sites selected for this study the following set of criteria were used:

Accuracy, purpose, currency, accessibility, objectivity or objective reasoning, writing style, page aesthetics or technical quality, and content.

Methodology

From the literature about Web site evaluation the set of criteria mentioned above was selected. These criteria are presented in eight major areas representing a total of twenty seven elements of evaluation. Using a random sampling twenty four Web sites were selected from an initial pool of seventy Web sites of institutions offering engineering distance learning programs. Web sites selected were analyzed using the twenty seven elements of evaluation. The evaluation instrument used in this study is in the section of this paper entitled: "Engineering Distance Learning Web Site Analysis Sheet". All Web sites were analyzed using the same set of criteria.

The initial point of accessing a distance learning site was its institutional home page. For example, to access the distance learning program of the Engineering School at X University, the initial point was the home page of X University.

Four grade levels were available for each evaluation criteria: 1 for poor, 2 for average, 3 for good and 4 for excellent. After a careful analysis of each Web site a value of 1 to 4 was given to each element in the criteria sheet. Of the twenty seven elements used two were evaluated as non-numerical or with a Yes or No as a possible answer. These two elements are not part of the statistical values generated but are included in the final evaluation of each Web site. A third element with an Yes, No option as a possible answer was given a value of 1 for No or a value of 4 for Yes. This related to the question about whether the "site has a searchable index". All values obtained were entered into an Excel Spreadsheet, the statistics and graphics are shown in the Results section of this paper.

Results

Inst.	2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	46	49	52	55	57	60	63	66	69
Total	85	60	59	86	65	91	36	72	58	73	97	55	79	58	47	54	67	60	96	96	48	91	77	36
Mean	3.4	2.4	2.36	3.44	2.6	3.64	1.44	2.88	2.32	2.92	3.88	2.2	3.16	2.32	1.88	2.16	2.68	2.4	3.84	3.84	1.92	3.64	3.08	1.44

Descriptive Stat. for the Total:

Mean	68.583
Stand E	3.804
Median	66
Mode	60
Stand D	18.636
Sample Va	347.297
Range	61
Min	36
Max	97
Sum	1646
Count	24

Freq.	1	2	3	4		1	2	3	4		1	2	3	4				
Acc	5	5	10	4	WSTY1	4	8	6	6	PATQ7	5	6	6	7	Freq	Total		%
Pur1	4	10	6	4	WSTY2	4	5	6	9	PATQ8	4	6	6	8	1	40	2	8.33
Pur2	3	7	9	5	WSTY3	2	0	13	9	PATQ9	3	7	8	6	2	60	9	37.5
Curr	0	1	0	23	PATQ1	15	0	0	9	PATQ10	0	2	17	5	3	80	6	25.
Accb1	6	7	3	8	PATQ2	2	11	7	4	PATQ11	8	0	0	16	4	100	7	29.2
Accb2	7	7	5	5	PATQ3	23	0	0	1	Cont1	3	8	4	9				
Obj1	2	4	15	3	PATQ4	0	0	2	22	Cont2	6	7	5	6				
Obj2	2	4	8	10	PATQ5	6	10	8	0	Cont3	6	7	3	8				
Obj3	2	1	14	7	PATQ6	9	5	5	5	Cont4	3	8	7	6				

The table above shows the descriptive statistics of the data obtained from the Analysis Sheet. Graphics 1, 2 and 3 supplement this information. In summary, of the 24 institutions' sites surveyed, using twenty five evaluative factors, four got 90 or more points; seven 80 or more points; and two received less than 40 points. While fifteen sites received between 41 and 79 points. The Mean value of points was 68.583 of a total of one hundred possible points. The Maximum value was 97 and the Minimum was 36.

On a scale of 1-40 two institutions' web site fall in this group, or 8.33 percent. Nine fell in the range of 41-60 points, or 37.5 %. Six fell in the range of 61-80 points, or 25 %. The remaining seven got more than 80 points for a 29.2%. Following these figures only 13 web sites, or 54.2 %, were found to be evaluated as "good" or "excellent" web sites. The other 11 web sites, or 45.8 %, were considered to be "poor" or "average". Independently from the data, when the evaluator completed the analysis of each web site, the total web site evaluations were: very good, six ; good, seven; average, two; and poor, nine. These left 13 as good or better and 11 as average or poor, which coincided with the numerical data.

Factors:

Curr (currency), Obj2 (information is valid), PATQ11 (search engine), PATQ4 (loading time), were the factors with a higher number of 4 values.

PATQ10 (site interactive), Obj1 (covered fact, opinion or propaganda), Obj3 (language free of bias), WSTY3 (text easy to read), and Acc (easy to access site), were the factors with a higher number of 3 values.

PATQ2 (relevant links), Pur1 (stated purpose), and PATQ5 (relevant graphics), were the factors with a higher of 2 values.

PATQ1 (searchable index), and PATQ6 (minimal layering), were the factors with higher numbers of 1 values.

Page layering to find the distance learning site is in general a problem because universities home pages usually do not have a direct link to their Distance Learning services. It varies from 2 to 8 the number of steps to access to appropriate page. Also, the initial layering search is usually a guessing game since the right initial link has many different entries as is shown in the list below, where each entry is followed by the number of occurrences:

Outreach 2, Extended education 1, Academics 5, Graduate programs 1, Academic programs 1, Extension 1, Continuing education 3, Admissions 1, Colleges 1, Academic & research 1, Resources and services 1, University services 1, Colleges and schools 1, A-Z index 1, and Schools 1.

Conclusions.

The results of this study indicates the need to improve the design, technical quality, and content of web pages for distance learning education with information related to engineering and technology programs. The attempt presented here of analyzing the content of information and set up of academic web pages makes this study unique. The results are fairly conclusive: about half of the web pages need some serious improvements. This is of significant importance since a web site, for distance learning education, is suppose to be a place for potential students to find information that is going to help them to enroll in an institutions' programs.

It is safe to suggest that more research is needed in the area of content analysis as a tool for evaluating Web pages, at the same time, the results of this study also suggest the need of further research in the areas of Web page design and of using Web sites as informational sources to academic programs.

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Engineering Distance Learning Web Site Analysis Sheet

University

School

Program or dept

URL

Web Browser recommended

ACCURACY (1)(2)(5)(6) Acc

How reliable and accurate is the information and the data source. (5)

PURPOSE (7)

Does the Web site have a clearly stated purpose. (7) Pur1

Is it substantive or just a collection of links. (7) Pur2

CURRENCY(1)(6)(5)(2)

Is the information current. (5) (2) Curr

ACCESSIBILITY (5)

How easy/difficult is to access the site. (5) Accb1

How easy/difficult is it to find information. (5) Accb2

OBJECTIVITY (5)

Is the information covered fact, opinion, or propaganda. (5) Obj1

Does the information appear to be valid and well researched. (5) Obj2

Is the language free of emotion-rousing words and bias. (5) Obj3

WRITING STYLE. (3)

Is the publication organized logically. (3) WSty1

Are the main points clearly presented. (3) Wsty2

Do you find the text easy to read (or is it stilted or choppy). (3) Wsty3

PAGE AESTHETICS (6) or TECHNICAL QUALITY (7)

Site has searchable index. (6) PATQ1

Additional relevant links. (6) PATQ2

Page requires other computer applications for viewing (i.e. Acrobat, Power Point). (6) PATQ3

Page loading time reasonable. (6) PATQ4

Use of relevant graphics. (6) PATQ5

Minimal page layering. (6) PATQ6

Is the site user-friendly. Is it easy to navigate around the site. (7) PATQ7

Is the home page concise and quick to view. (7) PATQ8

Do layout and design help the user to find information. (7) PATQ9

Is the site interactive (7) PATQ10

Is a search engine provided to search the site's content (7) PATQ11

CONTENT (7)

Is the information accurate, current, and unbiased when check against other sources. (7) Cont1

Completeness of the information provided. (5) Cont2

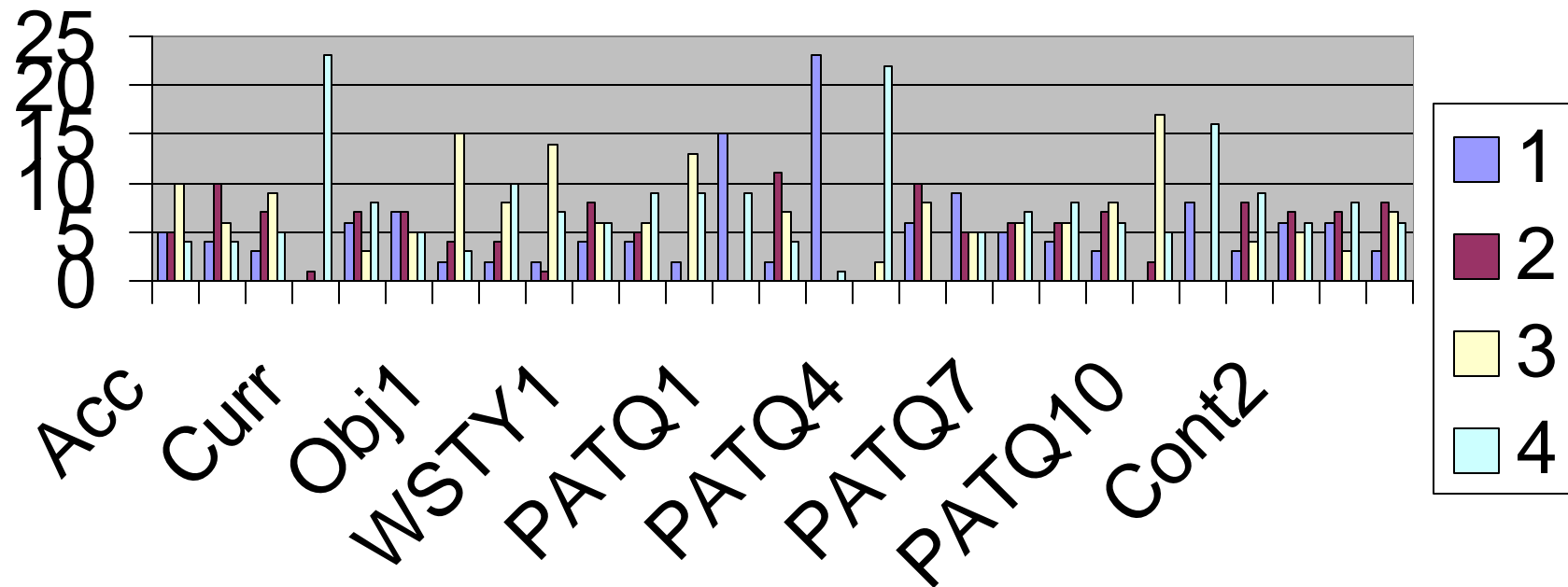
How comprehensive is this site. (8) Cont3

How valuable is the information provided in the Web Page (intrinsic value). (8) Cont4

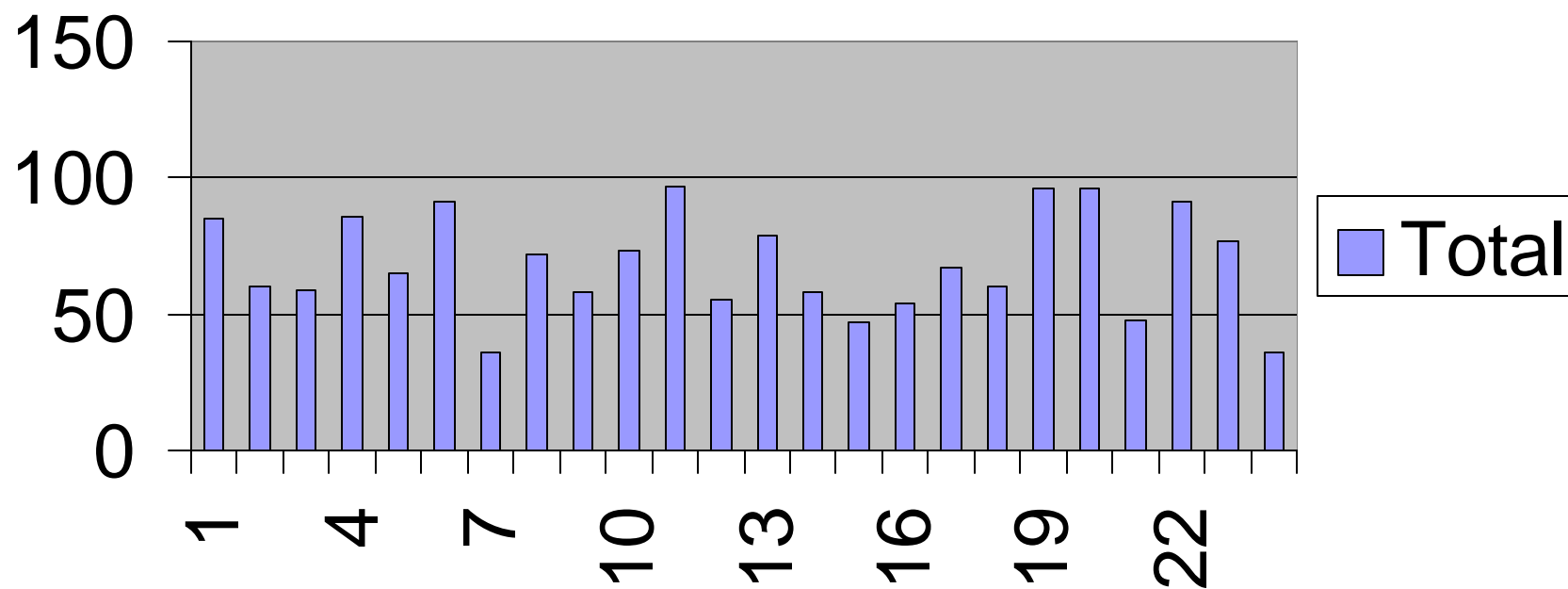
OVERALL SITE GRADE

Numbers in parenthesis refer to the sources in the literature indicated in page 1. Each evaluative factor has the variable name use in the spreadsheet. @ Nestor Osorio, Oct. 1998

Graph 1: Criteria Totals



Graph 2: Sites Totals



Graph 3: Sites Averages

